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REPORT FOR WEEK ENDING SATURDAY, APRIL 4th, '42

by  
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Extra-Laboratory Activities

Cornell: During the week two reports were received from Bacher covering work done at Cornell. The first was on the velocity distribution of neutrons emitted from a slow neutron source and the second was on the slow neutron resonance energy of Au and I. In the first report, the expected deviations between a Maxwellian distribution and that actually observed for C type neutrons was observed. In the second report, the resonance level in Au was determined as 4.5 electron volts and that in I was determined as being approximately 36 electron volts. The cyclotron at Cornell is undergoing repairs and cleaning and should shortly be ready to be put back into operation. The apparatus for the new set of experiments is now being constructed and should be ready as soon as the cyclotron is in operation.

9 Princeton: Three reports came in from Princeton, one from Furman and his group, one from Creutz and one from Snyder. Furman reported on certain experiments to estimate correctly the amount of boron present when there is a large excess of fluoride. A tentative but promising procedure has been developed. Furman also reported that polarographic studies had been carried on in an attempt to estimate the amount of cadmium and cobalt present in the materials. Using an old specimen of the oxide, no indication of cadmium was obtained while cobalt was already known to be present. Accompanying the report were reports of analysis on the metal produced by Westinghouse for boron, a tentative analysis of fluoride from Johns Hopkins and of the metal made from it, an analysis of the beryllium oxide powder used in the fabrication of crucibles for Westinghouse and of the boron content in some of the St. Mary's coal. Furman reported that Mr. Stanley had been sent to the Bureau of Standards to spend two days comparing the Princeton boron tests with those done by Mr. Scherrer at the Bureau. Creutz reported that the Princeton group had decided to stay there until the heating experiment had been completed. He also reported on his visit to the Brush Beryllium Corporation, particularly with respect to the fabrication of beryllium tubes. Creutz raised the question as to the possible presence of boron in the beryllium due to the fact that borax is sometimes used in the production of beryllium (Allison says that the Bureau of Standards was unable to find any trace of boron in the beryllium which Brush Beryllium is delivering to us). Creutz also reported on his visit to the Global Division of the Carborundum Company in which he found available materials which according to the correspondence with the Company, did not exist. The outcome of his visit would indicate that the materials we might desire are available for immediate shipment. At the Titanium Alloy Manufacturing Company, Creutz obtained samples of zirconium oxide crucibles, which they are developing for use in casting the metal. Two of these have been sent to Anderson, one to Marden and one to Princeton.

The final Princeton Report contained a suggestion for measurements of neutrons in the energy range from  $10^3$  to  $10^5$  electron volts, by the use of [redacted] this work is under construction and a [redacted] presented.

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New York University: The experiments on the aging effect in alcohol argon counters and in methane counters were started. The stabilized high voltage set was nearly completed and work was pushed ahead on the thin window counters. An experimental counter of this type is practically ready for test. It is hoped that it will be possible to operate this counter at atmospheric pressure and that it will be possible to count the total beta-ray emission from a test foil, using both sides of the foil. Work is also going ahead on the neutron cross section measurement apparatus.

Westinghouse: At Westinghouse things are moving ahead at high speed, metal is being steadily produced so that the ten kg. order which Westinghouse now has will probably be completed within the next three weeks. There is some 2 to 3 kg. of metal now available at Westinghouse, 1 kg. from the fluoride and approximately 2 kg. from the Westinghouse salt. The technique of casting the metal has been largely mastered and the metal has been gotten into ductile <sup>form</sup> so that rods have been drawn of approximately 1/8" in diameter and also wire down to some 20 or 30 mills. The metal has also been machined using a round-nosed tool with suitable rake and cooling with a slow stream of water. Marden is particularly anxious that a decision be reached on the shape and size of the metal castings. It is imperative if production is to go ahead according to schedule that orders be placed immediately for the crucibles. He is very anxious to know also just how round the spheres must be so that he can set tolerances on the crucibles. He hopes to be able to cast actual spheres instead of the hemispheres as cast for Creutz. The hemispheres cast for Creutz had densities of 18.89 and 18.98, which is somewhat higher than previous figures, but is undoubtedly due to the high purity of this material. Some difficulty is being had in obtaining sufficient quantities of high purity materials for production. A month's supply has been ordered and many of these materials are now on hand at the Westinghouse plant. Installation of equipment is going ahead rapidly and production should begin in approximately six weeks, although it will not reach full swing for at least eight weeks. One possible source of grief in the production program will come if the size of the units necessary for our work should prove to be too big. Spheres of approximately 1 1/2" in diameter can be readily melted with spark gap oscillators which are readily available in the Westinghouse organization. These oscillators can be gotten quickly and spares can be on hand to take care of continuous operation emergencies. Also the power supply at Westinghouse is ample to take care of these oscillators. If we should require large spheres of 2" or 3" in diameter, two difficulties arise. The first of these is in obtaining the necessary vacuum tube oscillators, the second is in the obtaining of the required power supply. It is possible to get a 50 or 100 kw. oscillator, if this is necessary. To get duplicate equipment would be difficult. The power supply situation, however, turns out to be rather critical, and with the present situation as far as priorities on power line equipment is concerned, might be an almost insurmountable obstacle. For these reasons also, Marden would very much like to know just what size will be required. With the spark oscillators they are melting successfully amounts of metal up to the neighborhood of 800 grams.

Canadian Uranium and Radium Corporation: Pregel says that the Eldorado Mines people have sent <sup>29</sup> to the <sup>airplane</sup> load of supplies has already gone <sup>with</sup> <sup>load</sup> <sup>to</sup> follow. He stated that the oxide capacity

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April 4, 1942

of the Port Hope plant could be pushed up to 8 to 10 tons per month, but that this appeared to be the limit. This limit is fixed by furnace capacity. In addition to the oxide, it is possible for them to supply nitrate triply recrystallized at about 2 tons per month, present capacity. This capacity, however, they can expand readily so that it should be possible for them to deliver in the neighborhood of ten tons of triply recrystallized nitrate in the near future if this should be desired. Pregel says that they have on hand some 150 tons of the material ready for processing at the present time. I did not get an estimate of how much ore they expect to be able to bring down this summer.

<sup>10</sup> Metal Hydrides Corporation: While in Washington a conference was held with Alexander. He states that he is now ready to go into production of the metal using the pure calcium and hopes to have the powder ready in the near future. The new equipment has not yet been installed completely so the first 50 lbs. may be processed in the old leaching tank. The new furnaces are being delivered and it is hoped that they can be in rapid production in the near future.

<sup>11</sup> Bureau of Standards: At the Bureau of Standards, Wensel is going to have measurements made of the vapor pressure of the metal and also of its thermal conductivity. The chemical tests are going ahead with considerable work being done on the spectroscopic analysis. The Bureau of Standards' tilting induction furnace is now ready for use and is available to cast the metal produced by Alexander in a variety of forms.

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